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The Efficacy of Classwide Peer Tutoring on Students with Attentional Difficulties

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The Efficacy of Classwide Peer Tutoring on Students with Attentional Difficulties

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By

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The Efficacy of Classwide Peer Tutoring on Students with Attentional Difficulties

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Classwide peer tutoring (CWPT) has been used as an effective intervention for reading, math, and spelling, as well as other subjects. The present study explored spelling and social skill improvement for students with attentional difficulties. Dependent measures included spelling improvement, mean initiations and responses, and total interaction times.

Expected treatment effects were not as strong as found in previous studies for spelling. Social skill effects were mixed, with more consistent results obtained with the initiation and duration measures during the first baseline to implementation phase of CWPT. Response to initiation results were more mixed; perhaps because of the new friendships the students made.

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The Efficacy of Classwide Peer Tutoring on Students with Attentional Difficulties

Classwide peer tutoring (CWPT) was first researched at the Juniper Gardens Children's Project at the University of Kansas in the early 1980's (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986). It was originally developed to improve academic performance for minority and at-risk students. Since then, classwide peer tutoring has been validated as an instructional medium for academic subjects including reading, mathematics, and spelling (Greenwood, Delquadri, & Hall, 1989).

Research has also been expanded into exploring the effects of CWPT with regular education students, the learning disabled, children with mental retardation, autistic children, the behaviorally disordered, and children with Attention Deficit/Hyperactivity Disorder (ADHD) (Greenwood, Terry, Arreaga-Mayer, & Finney, 1992; Dupaul & Henningson, 1993; Kamps, Barbetta, & Delquadri, 1994). More recently, CWPT has also been found to influence the social skills development of primary school students (Greenwood et al., 1992, Dupaul & Henningson,

1993, Kamps et al., 1994). The focus of the present study will be to investigate the secondary social skill gains of students with attentional difficulties who are taught spelling with CWPT.

In an early study, Stanley and Greenwood (1983) began studying academic engaged time for students of low and high socioeconomic status (SES). Students from low SES groups spent 11 min less per day actively engaged in academic activities than their high SES counterparts. The authors concluded that students from the low SES group would need to attend school for an additional month and a half to be as actively engaged in learning as the high SES group. Gettinger (1985) found that time engaged in academic activities was positively correlated with academic achievement. Based on this research, the Juniper Gardens Children's Project began to develop a program that would increase the academic engaged time of students. Their program could also be easily implemented and monitored in the classroom (Delquadri et al., 1986).

In a study by Greenwood, Dinwiddle, Bailey, Carta, Dorsey, Kohler, Nelson, Rotholz, & Schulte (1987), a learning disabled student was taught using a traditional

lecture and question method then given limited opportunity to respond or receive feedback. In the new classroom, the student was placed in an environment where frequent responding and feedback were present. The authors attributed the positive changes in the student's behavior to correction and feedback. CWPT was developed to replicate such an environment for all the students within a classroom. Unfortunately, it is impossible for a teacher to devote one-on-one attention to all the students. CWPT allows students to monitor and correct their peers during the instructional period, as well as provide immediate feedback during responding (Delquadri et al., 1986).

Using CWPT addresses several problems associated with the more traditional lecture and response approaches. First, academic engaged time is increased due to the students participating in a one on one instructional environment. Second, the students receive immediate correction and feedback that allows them to be reinforced for being correct, and at the same time to eliminate the error. Finally, off-task behavior and other classroom behavior problems are reduced due to the continuous interaction between the tutor and the tutoree.

Recently, CWPT research has expanded into new areas. Several longitudinal studies have been conducted to study the effects of CWPT for elementary students (Greenwood, 1991; Greenwood, Terry, Utley, Montagna, and Walker, 1993; Greenwood, Delquadri, & Hall, 1989). Greenwood et al. (1993) found that CWPT with low income and at risk students maintained gains in reading and math after three years. They also scored better on new science and social studies measures. Compared to control groups, the at-risk students from the CWPT groups had fewer referrals and placements to special education services. Greenwood et al. (1989) reported similar results when comparing a control group to low and high SES groups in first thru fourth grades. The students receiving CWPT experienced greater gains in both academics and engaged time.

Besides its efficacy with low income and at-risk students, CWPT has been shown to be effective with other special populations as well. Research has been conducted with children with autism (Kamps et al., 1994), the behaviorally disordered (Bell, Young, Blair, & Nelson, 1990; Greenwood, Carta, & Hall, 1988), and with children diagnosed with ADHD (Dupaul & Henningson, 1993). Academic

gains have been found in all of these groups. Research on students with behavioral disorders has shown that CWPT may be as useful as a behavioral intervention as it is for academic performance (Dupaul & Henningson, 1993; Bell et al., 1990). Dupaul and Henningson (1993) found improvements in attention, academic performance and off-task behavior for students with ADHD.

Historically, few studies have focused on the social aspects of CWPT. Kohler, Richardson, Mina, Dinwiddle, and Greenwood (1985) proposed that components of CWPT would facilitate the establishment of more positive peer relations. Unfortunately, research in the area of social skills improvement has been limited to date. One study of note investigated the effects of academic and social skills gains for high functioning autistic children (Kamps et al., 1994). The authors found that besides academic gains in reading, the autistic students and their peer counterparts made social skills gains during free play activities. These results were encouraging; besides being a useful intervention for academic problems, CWPT may help students enhance their social skills.

This current study attempted to partially replicate the findings of Kamps et al. (1994). The secondary social skills gains observed by Kamps and her colleagues were investigated using a different population known to have social skills deficits. Specifically the present study investigated the academic and social effects of CWPT on elementary age children with attentional problems in the classroom.

Children with attention problems pose a unique problem for teachers in the classroom. Besides the behavior problems that are associated with children who are frequently off-task, there are often learning deficits which are a result of the child's behavior (Milich & Landau, 1982; Teeter, 1991). Because of attentional and ADHD type symptoms, these children are often impaired in their social interactions (Frederick & Olmi, 1994), and are more likely to be rejected by their peers (Flicek & Landau, 1985). Despite a genuinely rich literature, few studies have addressed the specific issue of social skills training for students with attentional difficulties. Furthermore, no studies have attempted to integrate an instructional

program that addresses behavioral, learning, and social skills issues simultaneously.

The purpose of this study is to investigate academic and social skills changes produced by CWPT for students with attentional problems. Because of their lower baseline levels, it is predicted that target participants will make greater social skills and spelling gains with the implementation of CWPT than their control counterparts.

Methods

Participants

The target participants consisted of four elementary school students, three fourth graders (two females and one male) and one male second grader. There were also four control students, three fourth graders (two males and one female) and one female second grader. Four of the six fourth graders were 10 years old before the study with the last two turning 10 during the experiment. Both of the second grade participants were age eight during the study. All of the students were Caucasian and attended the same elementary school in a metropolitan district in the Midwest. Due to the limited number of students, target and control participants were not matched for gender.

All four of the target participants had difficulty spelling as reported by their teachers. Two of the target participants were diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and one with Attention Deficit Disorder (ADD). The remaining target subject was not formally diagnosed, but had characteristics of ADHD as rated by his teacher and parents on the Conners' Rating Scales-Revised. These rating scales were part of an educational assessment done several months prior to the study. The three target participants diagnosed with ADHD or ADD were taking stimulant medication during the course of the study.

Procedure

Teachers were trained on CWPT from the "Together We Can" manual published by Sopris West. Training of the teachers occurred during two instructional sessions. Teacher competency using CWPT was measured using a checklist provided in the manual. All the teachers successfully demonstrated each skill on the checklist and therefore were able to implement CWPT in their classrooms.

The participants were also trained in CWPT. Training sessions consisted of three or four, 30 min periods after

baseline data were collected. During training, participants learned their role as tutor, tutoree, and how to score points for correct answers. The role of tutor consisted of giving spelling words to the tutoree from a list provided by the teacher. The tutoree then said and wrote the word for the tutor. Two points were awarded when the tutoree spelled the word correctly on the first administration. If the tutoree misspelled the word, the tutor gave the correct spelling. The tutoree then rewrote the word three times. If the tutoree correctly wrote the word after being corrected by the tutor, he or she received one point. If the tutoree rewrote the word incorrectly then no points were awarded. After 8 min the role of tutor and tutoree were reversed and the procedures were repeated for another 8 min. At the end, the points earned for all students were then tallied and reported to the teacher for administration of rewards.

Every session participants were randomly placed into peer tutoring pairs. The target and control participants were paired with other students from the classroom. Each pair was then randomly placed on one of two teams for two weeks, along with the other classroom pairs who were not

being studied. After each CWPT session, the points from each pair were tallied and added to their respective team's total. The winning team for that session received applause and the losing team was encouraged to try harder during the next session. At the end of two weeks, the winning team received a reward consisting of pop and candy. At the beginning of the next two weeks, the students were randomly assigned to new pairs with the winning and losing team split to make new teams. The proceeding process was repeated so every student was on a winning team by the end of the study.

Immediately after each CWPT session, a 10 min free play period was implemented in order to promote social interactions among the students. Several activities were provided with each student joining a group. Activities included board games, computer games, puzzles, etc. Groups were limited to no more than five students with instructions, "be nice to your classmates", given before each play period. Social skills data were collected at this time by the observers in the classroom. Tutoring sessions were conducted three to four times per week.

Dependent Measures

Spelling achievement was measured for all target and control participants. Spelling pretests were given to all students on the Friday before the start of the new week's spelling list. Spelling posttests were given on the same Friday as the pretests, but consisted of words taught Monday thru Thursday of that same week. Mean percent increase for possible improvement between spelling pre and posttests was calculated for each student. For example, if a student spelled six out of ten words correctly on the pretest, she could improve her final score by a maximum of four words. If she spelled nine out of ten words correctly, thus getting three more words correct, she made a possible improvement of 75 percent. Such a measure was calculated because of possible ceiling effects due to high pretest scores. Tests were given and scored by the teacher in each classroom.

Social skills data were collected on the target and peer control participants during the 10 min free play period after tutoring. The procedure consisted of monitoring social interactions for each participant.

Social interactions consisted of initiations, responses to initiations, and duration of interactions.

Initiations were defined as any behaviors, verbal or motor, that were directed at another student in order to produce a social response. These included, but were not limited to talking, touching, sharing, and helping. Appropriate responses to initiations were defined as any behavior, verbal or motor, directed at the student who began the interaction. Responses must have occurred within three s of initiation. Duration of interaction was defined as the length of time occurring from the time of initiation to the end of reciprocal interaction between the two students. The interaction must have been reciprocal in nature and the result of the initiation response sequence recorded above.

Social skills measures were collected by trained observers during each free play period. Observers were trained before the study using video-tapes of special events conducted at the school in previous years. Observers consisted of two teachers, two teacher aides, and four senior honor roll students from a neighboring high school. Interobserver agreement for the initiations and

responses was determined by taking the total number of agreements divided by total number of agreements and disagreements multiplied by 100. The judgments of mean interaction time for two raters were determined by the percentage of total time the lower observer was in agreement with the higher observer. For example, if the first rater observed 90 s of total interaction time and the second 100 s, they were considered in 90 percent agreement.

Interobserver agreement for all observers was over 90 percent after training sessions were completed. Interobserver agreement was also measured throughout the course of the study. Each observer was checked at least once per week for all three dependent measures. Agreement percentage for initiations was 88.5% (range, 84.2% to 92.8%), for responses to initiations it was 87.6% (range, 83.1% to 90.3%), and for mean length of interaction it was 84.0% (range, 81.1% to 87.2%).

Design

An ABAB single subject design was used for this study. During the first baseline phase, normal teaching procedures for each classroom were in effect. Social skills data were collected during free play periods for the target and

control participants. Baseline data were collected for three weeks.

After baseline, CWPT was implemented for three to four sessions per week for a period of six weeks. After six weeks a return to baseline procedures was implemented for two weeks. During the final phase CWPT procedures were reinstated for the remaining three weeks of the study. Social skills and spelling data were collected during the course of the entire study on all target and control participants.

Results

Mean Percent Increase for Spelling Pre and Posttests

Table 1 presents the mean percent increase for possible improvement between spelling pre and posttests. During the first implementation of CWPT there were increases for participants T1, T3, and T4. Target participant T2 showed a small percentage decline after implementation of CWPT. Three of the peer control participants (C1, C3, C4) showed percentage increases after CWPT. Participant C4 obtained perfect pre and posttest scores during the first baseline condition. There was a decline in performance for control participant C2.

When baseline conditions were reestablished after six weeks, target participants T1, T3, and T4 showed a decline in performance from the CWPT phase. These declines ranged from 3.7% to 19.8%. Target student T2 had a slight increase of 1.4%. Control participants C1 and C4 remained at 100% improvement. Participant C2 showed an increase of 11.7%, while C3 declined 6.1%.

During the final phase of the study, all target participants showed mean percentage increases with the implementation of CWPT. Spelling improvement ranged from 5.8% to 17.3%. Two of the control participants showed decreases with the return to CWPT, with the other two having increases. Seven of the eight participants showed increases in performance from original baseline to final CWPT implementation ranging from 2.6% to 32.5%.

It must be noted that target and control participants T4 and C4 were two second graders with shorter spelling lists than the other students. Control participant C4 obtained perfect scores for all of the pre and posttests during initial baseline and final CWPT phases; therefore, data could not be used for spelling improvement. The remaining students in the fourth grade all had stable

pretest scores in which less than half of the words were spelled correctly.

Initiations and Responses

Table 2 shows the mean number of initiations and responses for the target and control students per session for each phase of the study. Target students T1, T3, and T4, as well as control students C1, C2, and C4, showed a positive directional change for initiations from baseline to the first implementation of CWPT. These changes ranged from 1.4 for student T4 to 5.4 for student T1. Mean initiations for the target group improved from 14.0 to 16.7, while the control group moved from 12.3 to 13.5.

A return to baseline condition showed a negative change in initiations for students T1, C2, C3, and C4. The remaining students did not show a consistent pattern of performance from the previous CWPT phase. The target group mean remained steady only moving from 16.7 to 16.3, while the control mean returned to the original baseline number 12.3. Upon return to the final CWPT phase, students T1, T4, C2, C3, and C4 showed improvement in initiations. Therefore, five of eight participants showed expected positive gains during re-implementation of CWPT. The

target mean had a positive change of 1.2, with the control mean improving 1.9. Overall, all of the students showed positive changes in initiations as the study progressed from original baseline to the final CWPT phase, ranging from 0.5 to 6.0.

Results on the response measure in Table 2 were much more inconsistent across phases. Since no firm pattern is evident in the response data in Table 2, no conclusions can be drawn. Treatment effects for responses were only seen for two participants, T1 and T4. During the first implementation of CWPT, participants T1 and T4 had mean response increases of 2.1 and 1.3, respectively. A return to baseline conditions showed decreases of 0.7 and 1.1. Returning to CWPT showed increases of 1.4 and 1.6. None of the other participants showed such a pattern.

Mean Duration of Total Interaction

Table 3 shows individual and group mean duration of interaction time for each phase of the study. All the participants, except for T4, showed an increase in total interaction time ranging from 4.3 to 19.9 s with the first implementation of CWPT. The target mean increased 8.1 s and the control mean improved 14.8 s. With a return to

baseline conditions six participants (T1, T2, C1, C2, C3, and C4) showed a negative directional change in mean duration of interaction time. These times ranged from 0.1 to 16.3 s. The target mean remained stable, only dropping by 0.9 s; whereas, the control mean moved from 161.3 to 154.9.

When CWPT was implemented during the final phase, five participants (T1, T4, C2, C3, and C4) produced positive gains in total interaction time. Target mean times showed a positive change of 2.1, the control mean increased by 13.4 s. Only three participants (T1, C2, and C4) showed expected treatment effects during each phase of the experiment for the total amount of interaction time.

Discussion

The results of this study are discrepant from the findings of Kamps et al. Spelling results showed treatment effects for the target participants during implementation phases of CWPT, but a similar trend was not seen in the control participants because of a ceiling effect in the dependent values calculated. Greenwood et al. (1987) found similar results due to ceiling effects in the highest scoring students. Participants C1 and C4 obtained perfect

posttest scores during the first CWPT and second baseline phases.

Spelling pretest and posttest scores appear largely the result individual study patterns: perhaps even greater than the affect of CWPT. It was not determined whether students were studying the lists before taking the pretests, or how much time was spent studying at home. Parent and student reports indicated that most of the students reviewed the spelling words before the pretest. Since the students had access to the spelling word lists before the pretests, the actual effects of CWPT may have been minimized. Future studies should attempt to control for these extraneous influences.

The pattern of social skills results was relatively consistent with Kamps et al. (1994), with the exception of responses. Although seven out of eight participants showed increases for interaction time and initiations during the first implementation of CWPT, only one target and two control participants responded to study phases as predicted. Mean interaction time for the target group showed no substantial decline when returning to baseline conditions, whereas the mean time for the control group was

responsive to each treatment phases. The failure of the target group to return to original baseline levels may be the result of friendship bonds being formed and maintained after the first implementation of CWPT. The control group likely had more established friendships prior to the study, thus returning to their typical social patterns during the second baseline phase. Even though all of the participants showed increases in initiations and interaction time between the first baseline and final CWPT implementation, the inconsistent results during the first CWPT and second baseline phase limit conclusions about the impact of CWPT on social skills.

Several issues may have limited the effects of CWPT during the study. First, the current study investigated a target population that was significantly different from Kamps et al. (1994). These authors used autistic children who had fewer established social skills than the target population of the present study. During initial baseline phase, the autistic population had mean total interaction duration times of less than 50 s per session. The four target students of the current study had mean interaction times of 150 to 193 s. The higher level of initiations,

responses, and interaction time may have produced a ceiling effect since there was less room for improvement as compared to autistic children. In fact, the hypothesis that ADHD students would improve more as a consequence of CWPT when compared with control participants must be rejected; if anything the control group responded more consistently to treatment phases with regard to initiations and interaction time.

Of the four target students, T1 was reported by her teacher as having the fewest social skills and had difficulties maintaining friendships. She was the only one to show a consistent effect of CWPT. The other three students were reported as having poor social skills, but capable of interacting and sustaining friendships.

Second is the issue of maintaining social skills once they are learned. Seven of the eight participants showed increases in mean duration of total interaction time between the original baseline and final CWPT phase. The other student varied across treatments by only a few seconds. It is unclear whether these effects are due to actual gains in social skills or an increased opportunity to make friends. CWPT places children in new groups that

they would not typically seek out during their day. Perhaps CWPT gave them the opportunity to interact with children outside their friendship circle and may have encouraged new bonds to be formed.

Finally, due to the scheduling of curriculum, half of the CWPT sessions were conducted in the morning at the beginning of school, and half in the afternoon after recess. Student performance may have been affected by the time of day and the activities that preceded CWPT. Teacher reports indicated that at least one target student was seen engaging in few social interactions during the morning. Transitioning from noon recess back to the classroom may also have had an effect. Not all students transition back to academic work equally well.

Limitations of the study include small target and control samples, limited collection techniques for gathering social skills data, treatment integrity across teachers, lack of control for study habits, implementation time, lack of gender pairing, no racial diversity, and transitions. Due to the case study structure of the experiment, only a small number of students could be used in the study. Individual variance between students cannot

be accounted for as with larger populations. Finally, the experimenter was not present during all of the implementation phases or data collection times.

Nevertheless teacher and student interviews were positive toward the use of CWPT as an instructional paradigm. Teacher and student training were seen as less positive by the teachers, but once the CWPT skills were learned, they were easily implemented in the class. Students reported they like CWPT due to the interaction with the other students and that instruction was done in a game format. When asked if they would use CWPT in the future, the teachers indicated they would, but their present curriculum made it difficult because of the manner in which spelling was typically taught in the school district. Students indicated they would like to continue with CWPT because they could win prizes.

When interviewed, teachers believed that CWPT had a positive effect on social skills for most of the students in the class. As a result of random pairing during instruction, each student had the opportunity to work with others: some of whom they would not otherwise interact with. One teacher reported less arguing between students

throughout the day when CWPT was implemented. These reports support data from Kamps et al.(1994) that structured activities create opportunities to interact, and children with poor social skills appear to benefit.

Overall, the findings of the current study were not as robust in supporting CWPT as the previous Kamps et al. (1994) study. But they investigated reading rate, while the present study measured spelling improvement. However, current results were not as strong as previous studies investigating CWPT and spelling such as Mallette, Harper, Maheady, & Dempsey (1991).

Future research needs to focus on several key areas. First, a direct comparison needs to be made between the social skills gains received from CWPT and from those of direct social skills training. The effectiveness of CWPT as a social skills intervention may not be comparable to direct social skills training. Second, long term retention of skills compared to other social skills training methods needs to be investigated. Third, CWPT places a student in an environment where he or she has an increased opportunity to use current social skills. It does not directly teach skills that a child may be missing. Finally, a more

effective method of collecting interaction data needs to be developed to discern actual social skills gains from the simple opportunity to make new friends, with a better criterion for identifying target populations with specific social skills deficits.

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Table 1

Mean Percent Increase for Possible Improvement between Spelling Pre and Posttests

	Phase			
Student	Baseline	CWPT	Baseline	CWPT
T1	54.9	79.8	60.1	87.4
T2	92.2	86.7	88.1	94.8
T3	72.3	94.8	82.1	96.0
T4	81.0	96.2	92.5	98.3
C1	90.5	100.0	100.0	98.7
C2	77.7	68.3	80.0	82.9
C3	77.8	81.2	75.1	88.8
C4	0.0	100.0	100.0	0.0

Note. Students T1-T4 are target students and C1-C4 are control students.

Table 2

Mean Number of Initiations and Responses of Students by Study Phase

	Phase			
Student	Basline I/R	CWPT I/R	Baseline I/R	CWPT I/R
T1	10.8/4.3	16.2/6.4	11.8/5.7	16.8/7.1
T2	17.2/7.2	18.0/6.7	18.8/7.5	17.9/8.1
T3	12.3/5.7	15.3/5.1	16.4/6.0	15.7/5.7
T4	15.8/7.1	17.2/8.4	18.2/7.3	19.7/8.9
T1-T4 mean	14.0/6.1	16.7/6.7	16.3/6.6	17.5/7.5
C1	15.2/8.3	17.1/9.0	17.0/7.8	16.7/7.7
C2	11.5/6.8	13.1/5.9	12.0/6.7	14.2/7.1
C3	13.0/7.7	12.5/8.1	11.8/7.9	13.5/6.8
C4	9.6/5.1	11.3/5.3	8.2/4.2	12.3/5.7
C1-C4 mean	12.3/7.0	13.5/7.1	12.3/6.8	14.2/6.8

Note. Students T1-T4 are target students and students C1-C4 are control students.

I/R are initiations/responses.

Table 3

Mean Duration of Total Interaction of Students by Study Phase

	Phase			
Student	Baseline	CWPT	Baseline	CWPT
T1	150.2	169.3	153.0	171.2
T2	193.2	197.5	197.4	193.1
T3	146.1	157.6	160.4	151.3
T4	183.4	180.6	190.6	194.3
T1-T4 mean	168.2	176.3	175.4	177.5
C1	172.1	193.0	182.4	181.5
C2	144.7	154.5	146.9	163.0
C3	147.2	156.3	155.6	171.3
C4	122.0	141.5	134.7	157.4
C1-C4 mean	146.5	161.3	154.9	168.3

Note. Students T1-T4 are target students and students C1-C4 are control students.